

## **Appendix C – Claim Severity Model**

### **Introduction**

For purposes of our analysis, we define the claim severity, or “loss rate,” as the ratio of the profit/(loss) on a property to the amount of principal unpaid on the loan. The profit/(loss) on a claim is defined as the acquisition cost plus holding costs plus selling expense less selling price. (Note that the amount of profit/(loss) can only be determined after the property has been disposed of.) The acquisition cost has three components: the unpaid loan balance, interest lost by the lender as a result of default, and legal/administrative costs associated with foreclosure. Holding costs are the net costs to FHA for repairing, maintaining, paying taxes, and collecting rents (if possible) on the property while it is held in inventory.

We understand that FHA frequently looks at loss as a ratio to acquisition cost (a component of the loss) but, for modeling purposes, it is more useful to use unpaid balance as the basis. We show the severity indications on both bases for clarification. We also show acquisition cost as a ratio to unpaid balance. The indications and selections are summarized in Exhibits C.1 through C.3.

### **Data Provided**

Our estimate of loss rate for future claims is based on an examination of actual losses, by quarter, since 1995 (that is, the last 23 calendar quarters). The actual rate is shown by quarter and by loan type in Exhibit C.2. For informational purposes, we also show acquisition cost relative to unpaid balance and loss relative to acquisition cost.

### **Trend Over Time**

We did notice a slight downward trend in loss rates over the last few years. We performed some simple regressions over time on the loss rates to test the significance of this apparent trend. The table below summarizes some relevant statistics regarding the results of these regressions.

**Table C.1**

<b>Loan Type</b>	<b>Adjusted R-squared</b>	<b>Coefficient on Time</b>	<b>t-Statistic on Time</b>
Fixed Rate, 30-Year	0.545593	0.0031992	5.23591
Fixed Rate, 15-year	0.360318	0.0048147	3.659517
Adjustable Rate	0.597137	0.0027197	5.797343
Streamline Fixed Rate, 30-Year	0.036814	0.0011757	1.356784
Streamline Fixed Rate, 15-Year	0.216492	-0.002562	-2.660611
Streamline Adjustable Rate	0.283852	0.003064	3.117678
<b>All Loan Types</b>	<b>0.607244</b>	<b>0.0033567</b>	<b>5.917293</b>

The coefficients on time are, for the most part, positive. Since the loss rates are represented here as negative numbers (reflecting losses rather than profits), the positive coefficients indicate an upward trend in the negative values, or a downward trend in loss rates on an absolute value basis.

From this information, we conclude that the trend is significant overall and in particular for the fixed rate, 30-year loans and for the adjustable rate loans. It appears less significant in the streamline loan types, but that could be a function of the relatively small size of these pools.

It is also less significant for the fixed rate, 15-year loans. We also notice that both the acquisition and the loss rates are noticeably worse for the 15-year loans than for the other loan types. We cannot explain this difference but, in future reviews, will research the issue further.

### **Selected Rate of Loss**

We selected a loss rate by loan type for future claims, based on the average of actual loan type loss rates over the last four quarters. We believe this reflects the apparent downward trend in loss rates (perhaps due to the loss mitigation programs in effect essentially since FY 1999). We also believe that this selection reflects a level of conservativeness, as the FHA Commissioner tells us that the loss rates in the beginning of (calendar year) 2000 were elevated slightly as there was an effort to dispose of properties that had been held for some time at slightly higher costs than had been experienced up to that point.

**Exhibit C.1**

**U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
ACQUISITION COST TO HUD AS A RATIO TO UNPAID LOAN BALANCE**

**BY LOAN TYPE**

<b>CALENDAR</b>									<b>ALL</b>
<b>YEAR</b>	<b>QUARTER</b>		<b>ARM</b>	<b>F15</b>	<b>F30</b>	<b>SARM</b>	<b>SF15</b>	<b>SF30</b>	<b>TYPES</b>
1995	1		115%	125%	118%	112%	114%	111%	118%
	2		116%	122%	118%	110%	118%	112%	118%
	3		115%	126%	119%	111%	115%	111%	118%
	4		115%	127%	118%	111%	114%	111%	118%
1996	1		114%	128%	119%	111%	120%	112%	118%
	2		115%	127%	119%	112%	117%	112%	118%
	3		115%	129%	120%	112%	117%	112%	119%
	4		115%	129%	118%	111%	118%	113%	117%
1997	1		115%	127%	119%	112%	121%	112%	117%
	2		115%	128%	118%	113%	121%	113%	117%
	3		115%	128%	118%	113%	121%	113%	117%
	4		115%	125%	118%	113%	121%	113%	117%
1998	1		116%	126%	119%	113%	121%	113%	117%
	2		116%	125%	118%	113%	124%	113%	117%
	3		116%	124%	118%	114%	126%	113%	117%
	4		116%	125%	118%	114%	129%	114%	117%
1999	1		116%	129%	118%	115%	125%	114%	117%
	2		116%	130%	118%	114%	130%	114%	117%
	3		115%	122%	117%	113%	126%	113%	116%
	4		116%	126%	117%	114%	128%	114%	117%
2000	1		117%	128%	119%	116%	130%	115%	118%
	2		118%	130%	118%	115%	132%	114%	118%
	3		117%	130%	118%	116%	132%	114%	118%
AVERAGE - ALL 5 YEARS			116%	127%	118%	113%	123%	113%	117%
AVERAGE - 4 QUARTERS			117%	129%	118%	115%	130%	114%	117%
AVERAGE - 8 QUARTERS			117%	128%	118%	115%	129%	114%	117%

**U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
MMIF PROFIT/(LOSS) AS A RATIO TO LOAN UNPAID BALANCE**

**BY LOAN TYPE**

CALENDAR									ALL
YEAR	QUARTER	ARM	F15	F30	SARM	SF15	SF30	TYPES	
1995	1	-45%	-67%	-48%	-40%	-41%	-41%	-47%	
	2	-45%	-69%	-48%	-46%	-32%	-40%	-48%	
	3	-45%	-68%	-52%	-48%	-41%	-44%	-51%	
	4	-43%	-66%	-48%	-45%	-39%	-42%	-47%	
1996	1	-43%	-63%	-48%	-45%	-38%	-40%	-47%	
	2	-42%	-69%	-48%	-45%	-36%	-43%	-47%	
	3	-43%	-70%	-50%	-44%	-37%	-44%	-49%	
	4	-44%	-68%	-51%	-45%	-39%	-46%	-50%	
1997	1	-43%	-68%	-51%	-46%	-43%	-47%	-49%	
	2	-43%	-68%	-48%	-50%	-41%	-48%	-48%	
	3	-42%	-68%	-49%	-47%	-37%	-45%	-48%	
	4	-43%	-65%	-47%	-49%	-39%	-47%	-46%	
1998	1	-44%	-73%	-49%	-49%	-47%	-46%	-48%	
	2	-42%	-63%	-46%	-45%	-42%	-46%	-45%	
	3	-43%	-68%	-46%	-49%	-51%	-47%	-46%	
	4	-40%	-60%	-44%	-44%	-50%	-46%	-43%	
1999	1	-42%	-66%	-44%	-47%	-46%	-46%	-44%	
	2	-39%	-51%	-44%	-44%	-49%	-43%	-43%	
	3	-34%	-49%	-37%	-36%	-38%	-40%	-37%	
	4	-38%	-52%	-40%	-39%	-45%	-41%	-40%	
2000	1	-41%	-68%	-45%	-41%	-51%	-42%	-44%	
	2	-42%	-57%	-45%	-40%	-48%	-40%	-44%	
	3	-38%	-60%	-41%	-37%	-51%	-35%	-40%	
AVERAGE - ALL 5 YEARS		-42%	-64%	-46%	-44%	-43%	-43%	-46%	
AVERAGE - 4 QUARTERS		-40%	-59%	-43%	-39%	-49%	-40%	-42%	
AVERAGE - 8 QUARTERS		-39%	-58%	-43%	-41%	-47%	-42%	-42%	
SELECTED:		-40%	-59%	-43%	-39%	-49%	-40%	-42%	

**U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
MMIF PROFIT/(LOSS) AS A RATIO TO ACQUISITION COST**

**BY LOAN TYPE**

CALENDAR									ALL
YEAR	QUARTER	ARM	F15	F30	SARM	SF15	SF30	TYPES	
1995	1	-39%	-53%	-40%	-36%	-36%	-37%	-40%	
	2	-38%	-57%	-41%	-42%	-27%	-36%	-41%	
	3	-39%	-54%	-43%	-44%	-36%	-39%	-43%	
	4	-38%	-52%	-40%	-40%	-34%	-38%	-40%	
1996	1	-37%	-49%	-40%	-41%	-32%	-36%	-40%	
	2	-37%	-54%	-41%	-40%	-30%	-38%	-40%	
	3	-37%	-55%	-42%	-39%	-32%	-39%	-42%	
	4	-39%	-53%	-43%	-40%	-33%	-41%	-43%	
1997	1	-37%	-53%	-43%	-41%	-35%	-42%	-42%	
	2	-38%	-53%	-41%	-45%	-34%	-42%	-41%	
	3	-37%	-53%	-41%	-42%	-30%	-40%	-41%	
	4	-37%	-52%	-40%	-43%	-32%	-41%	-39%	
1998	1	-38%	-58%	-41%	-43%	-39%	-41%	-40%	
	2	-36%	-51%	-39%	-40%	-34%	-40%	-39%	
	3	-37%	-55%	-39%	-43%	-41%	-42%	-39%	
	4	-34%	-48%	-37%	-39%	-39%	-40%	-37%	
1999	1	-36%	-51%	-38%	-41%	-37%	-41%	-38%	
	2	-34%	-39%	-37%	-38%	-37%	-38%	-36%	
	3	-30%	-40%	-32%	-32%	-30%	-36%	-32%	
	4	-32%	-41%	-34%	-34%	-35%	-36%	-34%	
2000	1	-35%	-53%	-38%	-35%	-40%	-37%	-37%	
	2	-36%	-44%	-38%	-35%	-37%	-35%	-37%	
	3	-32%	-46%	-35%	-31%	-38%	-31%	-34%	
AVERAGE - ALL 5 YEARS		-36%	-51%	-39%	-39%	-35%	-39%	-39%	
AVERAGE - 4 QUARTERS		-34%	-46%	-36%	-34%	-37%	-35%	-36%	
AVERAGE - 8 QUARTERS		-34%	-45%	-36%	-36%	-37%	-37%	-36%	